Nutrient Management Act, 2002

Winter Application of Manure and Other Agricultural Source Materials

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Factsheet

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INTRODUCTION

Livestock and non-livestock farmers can attest to the positive value of manure and other agricultural source materials (ASM) used in crop production. Valuable nutrients and organic matter are supplied through these products. Nutrients help reduce crop input costs while increases in organic matter lead to better soil structure and higher crop yields. Proper management of manure and other agricultural source materials will maximize their value while minimizing their environmental impact.

However agricultural source materials, rich in nitrogen and phosphorus, can contaminate water sources if improperly applied. This is particularly true when the soil is frozen or snow-covered, since this increases the potential for runoff to surface water. Therefore, it is important to understand the factors affecting the application of manure and other agricultural source materials to land during winter and other times when soil is snow-covered or frozen.

WHEN DOES "WINTER" START?

The Nutrient Management Act, 2002, with its regulation O. Reg. 267/03 (Regulation) addresses two time periods that may or may not overlap. The first is based on calendar dates – December 1 to March 31 or "winter". The second period is any other time when the soil is frozen or snow-covered. Frozen soil is any 5 cm layer of frozen moisture in the top 15 cm of soil. Snow-covered soil is soil with a layer of snow on the surface with an average minimum depth of 5 cm.

The Regulation is most restrictive for winter applications.

Figure 1. As snow melts, manure and other agricultural source materials can be carried into surface water.

WINTER APPLICATION IS NOT RECOMMENDED

Winter applications of manure and other agricultural source materials increase the risk of polluting the environment.

During winter manure tends to be applied on fields most readily accessible and not necessarily the fields that need the manure the most. In addition, only parts of a field may be available due to snow drifts, wet areas or other physical factors further limiting the area available for application.

The risk of runoff to surface water increases when applying on frozen or snow-covered ground. If a thick layer of snow on the soil's surface melts quickly, rapid surface water runoff will flush nutrients to adjacent surface water sources. Fresh snow contains about 0.25 cm of water for every 2 cm of depth (1/10th of an inch for every inch) but the water content increases as the snow ages and settles. Frozen soils have limited

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or no infiltration, so immediate runoff occurs if there is rainfall before the soil thaws.

Research shows that:

- the greatest risk of runoff and nutrient loss is when application occurs within 72 hours of a rainfall or snowmelt conditions
- manure applied in early winter (i.e. December) during *dry* conditions may have a lower risk of nutrient loss than manure applied on wetter or snow-covered conditions

Avoid spreading if the weather report indicates either precipitation is likely or temperatures that will result in snowmelt.

With winter applications there are no growing crops available to absorb the nutrients. The increased risk of losses also means that fewer nutrients in winter-applied manure are available for crop production in the following season.

There are several environmental laws that make it an offence when manure enters surface water. The main pieces of legislation to be aware of would be the Environmental Protection Act, the Ontario Water Resources Act, and federally, the Fisheries Act. All Ontario statutes can be found at www.e-laws.gov.on.ca/index.html. For more information see the article on winter spreading at www.omafra.gov.on.ca/english/nm/newsletter/2009/February/article2.htm.

Spreading dark manure on white snow may also draw unwanted attention to your farm. This may increase the number of complaints lodged against the operation and the industry as a whole.

Figure 2. Manure spread on snow can bring unwanted attention to the farm.

For all the above reasons, it is not recommended to spread manure or other agricultural source materials in the winter.

ALTERNATIVES TO WINTER SPREADING

There are alternatives to winter spreading. These include:

- temporary field nutrient storage sites for solid manure
- higher rates of application at other times of the year if agronomic rates allow it
- transferring the nutrient to a broker or other neighbouring storage facility that is available
- acquiring access to more land through ownership or control or by means of an application agreement, rental or other agreement
- keeping manure in "pen packs" or mounded bedding packs in outdoor feeding yards for longer periods of time, reducing the need to spread during winter conditions
- sizing storages for greater capacity (i.e. up to a year) to provide more flexibility for manure application and allow timing for manure application when the crops can better use these nutrients

According to the Regulation some farms may require a nutrient management strategy (NMS) or nutrient management plan (NMP). A nutrient management strategy outlines how manure and other ASM are to be stored and managed, while a nutrient management plan details land application rates and timing.

A contingency plan is a written plan of what to do in the event that a nutrient management strategy or plan cannot be followed. The plans must address what will be done if:

- more nutrients are available than the NMS or NMPs have addressed
- more nutrients are generated than the storage design capacity
- there is a spill and
- weather or equipment conditions impede planned storage or application

Even if you do not have a nutrient management strategy or plan, good planning could reduce the need for winter spreading and lessen any adverse environmental effect.

IF MANURE MUST BE SPREAD IN WINTER

If winter application of manure or other ASM is required, farms with a NMP must follow the standards outlined in the Regulation. For all other farms, these standards are recommended as best management practices.

Site Selection

If manure must be applied in the winter, choosing appropriate fields can reduce the potential for environmental impact.

- Select fields covered by a living crop or crop residue. The vegetation and/or residue act as a barrier to particles moving across the soil surface.
- Select fields located away from surface water or tile inlets to reduce the chances that materials will be discharged into surface water.
- Do not apply to any land subject to flooding or where water collects, then flows into surface water.
- Sloped fields in close proximity to surface water or tile drains are not suitable.

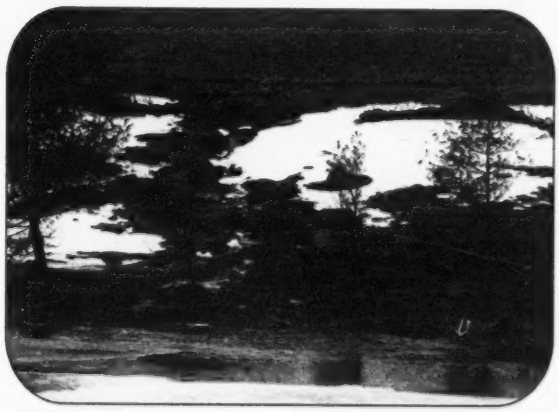

Figure 3. If it is absolutely necessary to spread manure in the winter, site selection is important. Sloped fields close to surface water are not recommended due to the increased potential for runoff.

Setbacks

There are minimum setbacks for applications near surface water. However, consider the dry matter content of the manure, slope of the land, depth of snow cover and drainage before applying manure in winter or other times when the soil is frozen or snow-covered.

- If the manure is liquid, and the slope of the land is greater than three per cent, the required setback is 100 m from the top of the bank of the surface water.
- The setback is also 100 m for the application of solid agricultural source material when the slope of the land is six per cent or more.
- Never spread manure or ASM on vegetated buffer zones near surface water.

Injection or Incorporation

During winter when the ground is not frozen or snow-covered it may be possible to use tillage and application practices to reduce the potential for runoff.

- Liquid manure must be injected, or spread and incorporated into the soil within the same day of application.
- Solid manure must be incorporated into the soil, or applied on a land covered by a living crop or crop residue, such as a pasture field.

Injection or incorporation into the soil when it is frozen or snow-covered is even more strictly regulated. It is difficult at best, and impossible for most.

- The Regulation requires that if land application occurs when the ground is frozen or snow-covered, injection or incorporation of liquid manure into the soil must happen within six hours of land application.
- Solid manure must be incorporated into the soil within six hours of land application, or surface applied on fields with a living crop or crop residue.

Application Rates

Reducing the application rates may decrease the potential for environmental impacts from application in winter or other times when the soil is frozen or snow-covered. Apply the minimum amount of manure that enables managing the remaining manure with available storage until spring.

WEATHER CONDITIONS

As stated earlier, avoid manure application if precipitation is in the forecast or if the temperature is forecasted to rise to a level where snowmelt is likely to occur.

CONCLUSION

Winter application of manure is not recommended because of increased risk of nutrient loss due to runoff, leaching through saturated ground or preferential flow to tile drains. For farms required to have a NMP, there are regulatory requirements to be followed for winter application. Even if a farm is not required to have a NMP, there is an increased risk of adverse effect with winter spreading, which can result in charges under environmental regulations. If a farm is considering manure application during winter, consider the following:

- weather conditions and forecast
- regulatory requirements
- alternatives to winter spreading
- appropriate site selection

REFERENCES

Water Management – Legislation and Guidelines
Protecting Water Resources
www.omafra.gov.on.ca/english/environment/water/legislation.htm

e-Laws Ontario, a database of Ontario's statutes and regulations
www.e-laws.gov.on.ca/index.html

Best Management Practices: Manure Management
www.omafra.gov.on.ca/english/environment/bmp/manure.htm

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